

## PATENT COOPERATION TREATY

PCT

## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner  
US Department of Commerce  
United States Patent and Trademark  
Office, PCT  
2011 South Clark Place Room  
CP2/5C24  
Arlington, VA 22202  
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 01 November 2000 (01.11.00)	
International application No. PCT/SG99/00014	Applicant's or agent's file reference ST/63235
International filing date (day/month/year) 26 February 1999 (26.02.99)	Priority date (day/month/year)
Applicant HUI, Yau, Wei, Lucas et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

12 September 2000 (12.09.00)

☐ in a notice effecting later election filed with the International Bureau on:2. The election ☒ was☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

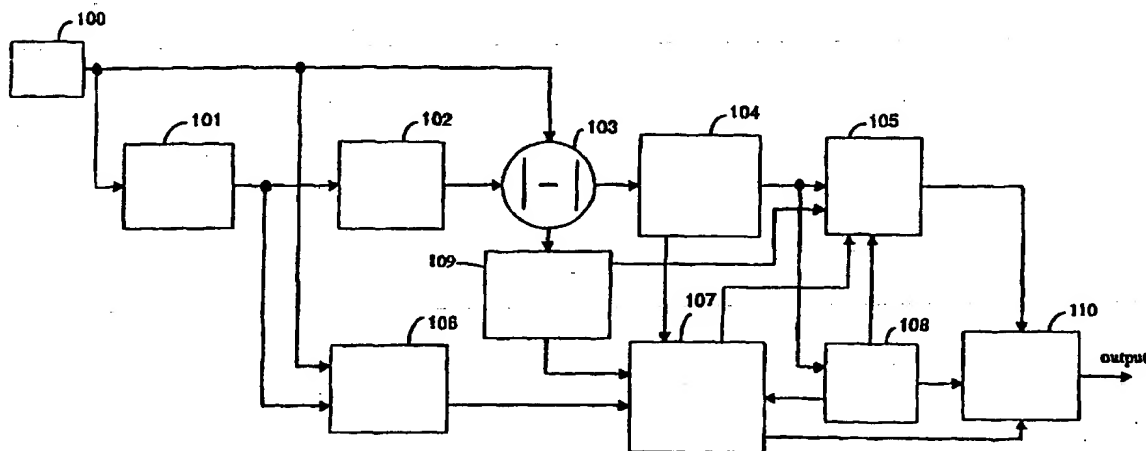
The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Zakaria EL KHODARY Telephone No.: (41-22) 338.83.38
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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>7</sup> : H04N 7/26, 7/01, 5/44, 5/14		A1	(11) International Publication Number: <b>WO 00/51355</b>
			(43) International Publication Date: 31 August 2000 (31.08.00)
(21) International Application Number: PCT/SG99/00014 (22) International Filing Date: 26 February 1999 (26.02.99) (71) Applicant (for all designated States except US): STMICRO-ELECTRONICS ASIA PACIFIC PTE LTD [SG/SG]; 28 Ang Mo Kio Industrial Park 2, Singapore 569508 (SG). (72) Inventors; and (75) Inventors/Applicants (for US only): HUI, Yau, Wei, Lucas [SG/SG]; 10H Braddell Hill, #24-31, Singapore 579727 (SG). GOH, Kwong, Huang [SG/SG]; Block 323 Jurong East Street 31, #06-216, Singapore 600323 (SG). (74) Agent: DONALDSON & BURKINSHAW; P.O. Box 3667, Singapore 905667 (SG).		(81) Designated States: JP, SG, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).  <b>Published</b> With international search report.	

(54) Title: METHOD AND APPARATUS FOR INTERLACED/NON-INTERLACED FRAME DETERMINATION, REPEAT-FIELD IDENTIFICATION AND SCENE-CHANGE DETECTION



(57) Abstract

A method of processing video data to detect field characteristics of the data, said data having a plurality of fields, including the steps of: comparing first and second fields, said first field being a successive field of said second field; comparing pixel values of respective sub-blocks of said first field and a third field, said second field being a successive field of said third field; determining whether said first field is an interlaced field or a progressive field with respect to a successive field of said first field based on said steps of comparing.

**FOR THE PURPOSES OF INFORMATION ONLY**

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AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
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AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
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DE	Germany	LK	Sri Lanka	SD	Sudan		
DK	Denmark	LR	Liberia	SE	Sweden		
EE	Estonia			SG	Singapore		

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/SG 99/00014

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H04N7/26 H04N7/01 H04N5/44 H04N5/14

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 95 15659 A (COMPRESSION LABS INC) 8 June 1995 (1995-06-08) page 32, line 12 - page 34, line 27 page 45, line 34 - page 49, line 33 page 50, line 17 - page 51, line 19 -----	1-14
A	US 5 452 011 A (MARTIN ALIX ET AL) 19 September 1995 (1995-09-19) cited in the application column 3, line 8 - column 5, line 14 -----	1-14

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

17 August 1999

Date of mailing of the international search report

24/08/1999

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
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Authorized officer

Beaudoin, O

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/SG 99/00014

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9515659 A	08-06-1995	US 5828786 A	27-10-1998
		AU 1210495 A	19-06-1995
		US 5923784 A	13-07-1999
US 5452011 A	19-09-1995	CA 2143230 A	15-09-1995
		CN 1118970 A	20-03-1996
		EP 0673169 A	20-09-1995
		JP 7264548 A	13-10-1995
		SG 22890 A	28-11-1995

- 12 -

Claims:

1. A method of processing video data to detect field characteristics of the data, said data having a plurality of fields, including the steps of:
  - 5 comparing first and second fields, said first field being a successive field of said second field;
  - comparing pixel values of respective sub-blocks of said first field and a third field, said second field being a successive field of said third field;
  - determining whether said first field is an interlaced field or a progressive field with
    - 10 respect to a successive field of said first field based on said steps of comparing.
2. The method as claimed in claim 1, further including the step of accumulating, in an accumulator means, absolute differences between the pixel values of said first and third fields.
- 15 3. The method as claimed in claim 2, wherein said step of determining is further based on an output of said accumulator means.
4. The method as claimed in claim 3, further including the step of determining whether said first field is a repeated field based on a result of said step of comparing pixel values, on
  - 20 said output of said accumulator means and on a result of said step of determining whether said first field is an interlaced field or a progressive field.
5. The method as claimed in claims 3 or 4, further including the step of determining whether or not there has been a scene change between said first and third fields, at least in
  - 25 part based on said output of said accumulator means.
6. The method as claimed in claim 5, further including the step of grouping successive fields according to one or more of said steps of determining.
- 30 7. The method as claimed in any preceding claim, wherein said step of comparing first

# PATENT COOPERATION TREATY

## PCT

REC'D 28 MAR 2001

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### INTERNATIONAL PRELIMINARY EXAMINATION REPORT



(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>63235PAT/STM</b>		<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. <b>PCT/SG99/00014</b>	International filing date (day/month/year) <b>26/02/1999</b>	Priority date (day/month/year) <b>26/02/1999</b>	
International Patent Classification (IPC) or national classification and IPC <b>H04N7/26</b>			
Applicant <b>STMICROELECTRONICS ASIA PACIFIC PTE LTD et al.</b>			

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 7 sheets, including this cover sheet.  
  
☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).  
  
 These annexes consist of a total of 1 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand  <b>12/09/2000</b>	Date of completion of this report  <b>26.03.2001</b>
Name and mailing address of the international preliminary examining authority:   <b>European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465</b>	Authorized officer  <b>Guettlich, J</b>  Telephone No. +49 89 2399 2688  

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/SG99/00014

## I. Basis of the report

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments (Rules 70.16 and 70.17).):*

### Description, pages:

1-11 as originally filed

### Claims, No.:

7 (part), 8-14 as originally filed

1-6, 7 (part) as received on 19/02/2001 with letter of 13/02/2001

### Drawings, sheets:

1/6-6/6 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:



**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/SG99/00014

- ☐ the description,      pages:  
☐ the claims,      Nos.:  
☐ the drawings,      sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

- ☐ the entire international application.  
☒ claims Nos. 6,14.

because:

- ☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):
- ☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 6,14 are so unclear that no meaningful opinion could be formed (*specify*):  
**see separate sheet**
- ☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.
- ☐ no international search report has been established for the said claims Nos. .

2. A meaningful international preliminary examination report cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

- ☐ the written form has not been furnished or does not comply with the standard.  
☐ the computer readable form has not been furnished or does not comply with the standard.

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/SG99/00014

## 1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	1-5,7-13
Inventive step (IS)	Yes: Claims	
	No: Claims	1-5,7-13
Industrial applicability (IA)	Yes: Claims	1-5,7-13
	No: Claims	

## 2. Citations and explanations see separate sheet

## VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:  
**see separate sheet**

## VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:  
**see separate sheet**

**Re Item III**

**Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

Claims 6 and 14 are not understood, because it remains unclear from the wording of the claims what grouping decision means (or the related method steps) do and what their relationship to results of scene change decision means, repeat field decision means or interlace/progressive decision means is.

**Re Item V**

**Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

V.1 Reference is made to the following document:

D1: WO 95 15659 A (COMPRESSION LABS INC), 8 June 1995

V.2 Regarding claims 1-3, 8 and 9-11:

D1 is considered to represent the most relevant state of the art. It discloses a method and an apparatus/a system for detecting video field characteristics (interlaced/progressive fields; repeated frames; scene cuts) in a video data stream in order to increase the efficiency of video data compression comprising at least the technical features of the above-mentioned claims.

The pixel values of first and second video fields are compared. Furthermore, the pixel values of successive fields having the same parity (equivalent to first and third fields) are compared on strip level (equivalent to so-called sub-blocks).

The comparisons are performed by differential accumulators which create absolute differences between the pixel values of the various video fields. The absolute differences between a first and a third video field are used to determine whether the fields are interlaced or progressive (p.32, line 12 - p.33, line 12; fig.4B, (450-453)).

The examiner has noted that D1 also discloses that monitoring of pixel differences between pixel pairs belonging to adjacent even and odd lines may be required to distinguish between interlaced and progressive input video data (p.33, line 33 - p.34, line 18). However, the claims currently on file do not explicitly exclude additional method steps or means for detecting particular video data

characteristics.

**V.3 Regarding claims 4 and 12:**

D1 describes that the step of determining whether a first field is a repeated field is based on the comparison of pixel values between the first and the third fields (p.33, lines 6-12). It is also known that the results of the scan pattern analysis (fig.7A, (703)) are required to correctly determine the characteristics of a field pair for the subsequent repeat frame analysis (704) (p.44, line 6 - p.50, line 22).

**V.4 Regarding claims 5 and 13:**

D1 discloses a scene cut analysis (p.51, line 20 - p.59, line 15) which interacts with the repeat frame analysis mentioned in the previous paragraph. The scene cut analysis uses the accumulated differences between fields of the same parity (first and third fields) to determine whether scene changes have occurred.

**V.5 Regarding claim 7:**

D1 also mentions the use of thresholds by the statistical data processor (p.35, lines 7-17), whereby in one case the absolute pixel differences between strips of a first and a second field (DA-i) are tested against a strip activity threshold (T<sub>m</sub>) (p.46, line 32 - p.47, line 7; fig.7C).

**V.6 The claimed invention is considered industrially applicable in the field of video data analysers and processors (Art.33(4) PCT).**

**Re Item VII**

**Certain defects in the international application**

**VII.1** Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in D1 is not mentioned in the description, nor is this document identified therein.

**VII.2** Independent claims 1 and 9 are not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art (e.g. D1) being placed in the preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in the

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/SG99/00014

characterising part (Rule 6.3(b)(ii) PCT).

VII.3 The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

**Re Item VIII**

**Certain observations on the international application**

VIII.1 The term "sub-block" used in claims 1 and 9 is unclear, because no precise definition with regard to a particular type of subdivision is given as part of the claims. Consequently, any type of video field subdivision was considered for the above examination.

# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>ST/63235</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/SG 99/ 00014</b>	International filing date (day/month/year) <b>26/02/1999</b>	(Earliest) Priority Date (day/month/year)
Applicant  <b>STMICROELECTRONICS ASIA PACIFIC PTE LTD et al.</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 2 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

**1. Basis of the report**

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).
- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :
- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

**4. With regard to the title,**

- ☒ the text is approved as submitted by the applicant.
- ☐ the text has been established by this Authority to read as follows:

**5. With regard to the abstract,**

- ☒ the text is approved as submitted by the applicant.
- ☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

**6. The figure of the drawings to be published with the abstract is Figure No.**

- ☐ as suggested by the applicant.
- ☒ because the applicant failed to suggest a figure.
- ☐ because this figure better characterizes the invention.
- 1 \_\_\_\_\_  
☐ None of the figures.

# INTERNATIONAL SEARCH REPORT

National Application No

PCT/SG 99/00014

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H04N7/26 H04N7/01 H04N5/44 H04N5/14

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 95 15659 A (COMPRESSION LABS INC) 8 June 1995 (1995-06-08) page 32, line 12 - page 34, line 27 page 45, line 34 - page 49, line 33 page 50, line 17 - page 51, line 19 ---	1-14
A	US 5 452 011 A (MARTIN ALIX ET AL) 19 September 1995 (1995-09-19) cited in the application column 3, line 8 - column 5, line 14 -----	1-14

☐

Further documents are listed in the continuation of box C.

☒

Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

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"&" document member of the same patent family

Date of the actual completion of the international search

17 August 1999

Date of mailing of the international search report

24/08/1999

Name and mailing address of the ISA

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Fax: (+31-70) 340-3016

Authorized officer

Beaudoin, O

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/SG 99/00014

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9515659 A	08-06-1995	US 5828786 A	27-10-1998
		AU 1210495 A	19-06-1995
		US 5923784 A	13-07-1999
US 5452011 A	19-09-1995	CA 2143230 A	15-09-1995
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		EP 0673169 A	20-09-1995
		JP 7264548 A	13-10-1995
		SG 22890 A	28-11-1995



## PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

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International application No. <b>PCT/SG 99/00014</b>	International filing date (day/month/year) <b>26/02/1999</b>	(Earliest) Priority Date (day/month/year)
Applicant <b>STMICROELECTRONICS ASIA PACIFIC PTE LTD et al.</b>		

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## 1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

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2. ☐ **Certain claims were found unsearchable** (See Box I).

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☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☐ as suggested by the applicant.

☒ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

1  
☐ None of the figures.

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/SG 99/00014

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H04N7/26 H04N7/01 H04N5/44 H04N5/14

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 95 15659 A (COMPRESSION LABS INC) 8 June 1995 (1995-06-08) page 32, line 12 - page 34, line 27 page 45, line 34 - page 49, line 33 page 50, line 17 - page 51, line 19 ---	1-14
A	US 5 452 011 A (MARTIN ALIX ET AL) 19 September 1995 (1995-09-19) cited in the application column 3, line 8 - column 5, line 14 -----	1-14

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## ° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&amp;" document member of the same patent family

Date of the actual completion of the international search

- 17 August 1999

Date of mailing of the international search report

24/08/1999

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/SG 99/00014

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9515659 A	08-06-1995	US 5828786 A AU 1210495 A US 5923784 A	27-10-1998 19-06-1995 13-07-1999
US 5452011 A	19-09-1995	CA 2143230 A CN 1118970 A EP 0673169 A JP 7264548 A SG 22890 A	15-09-1995 20-03-1996 20-09-1995 13-10-1995 28-11-1995